



Foam Optics And Mechanics (FOAM)



Glenn Research Center

PI: Prof. Douglas Durian, Physics, Department, Univ. of Pennsylvania

PM: Dr. Brian Motil NASA GRC,

PS: Dr. Padetha Tin, NCSE at NASA GRC)

ESA PIs: Langevin, Saint-Jalmes, Adler (France); Vanderwalle (Belgium);

Waier (Ireland); Odenbach, Barnhardt (Germany); Kronberg (Sweden)

Hardware Development/Engineering: ESA, Major contractor EADS

Science Objectives:

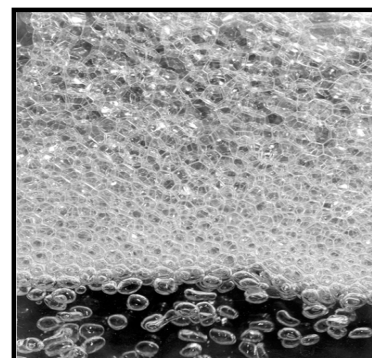
- ◆ To exploit microgravity conditions to quantify and elucidate the unusual elastic character of foam structure and dynamics.
- ◆ To observe how the foam melts into a simple viscous liquid as a function of both increasing liquid content and shear strain rate.

Relevance/Impact:

- ◆ The proposed flight research generate valuable fundamental guidance for the development of materials with more desirable rheology and better stability.
- ◆ On board Rheometry and light scattering techniques will provide the rheology and coarsening in terms of microscopic structure and dynamics.

Development Approach:

- ◆ The FOAM flight project is being divided into two major payloads.
 - 1) FOAM Stability will be launched in May 2009 (Increment 19).
 - 2) FOAM Coarsening is still pending.
- ◆ ESA is developing both experiments. US P.I. is funded by NASA.



Wet Foam and Drainage



ESA Fluids Science Lab

ISS Resource Requirements

| | |
|---|--|
| Accommodation Carrier | FSL Fluids Science Laboratory Progress/Soyuz |
| Upmass (kg) (w/o packing factor) | 50 |
| Volume (m³) (w/o packing factor) | |
| Power (kw) (peak) | |
| Crew Time (hrs) (installation/operations) | 4 Hrs min. for FOAM Stability TBD for FOAM Coarsening |

Project Life Cycle Schedule

| Milestones | PRR | SRR | PDR | CDR | FHA | Launch | Ops | Return | Final Report |
|------------------|--------------------|-----|-----------|---------------|-----------|------------------------|------|--------|--------------|
| Actual/ Baseline | | | July 2007 | Sept 2008 | L- 6 mos. | May 2009 | 2009 | 2009 | 2010 |
| Documentation | Website: eRoom: | | | SRD: EDMP: | | Project Plan: SEMP: | | | |